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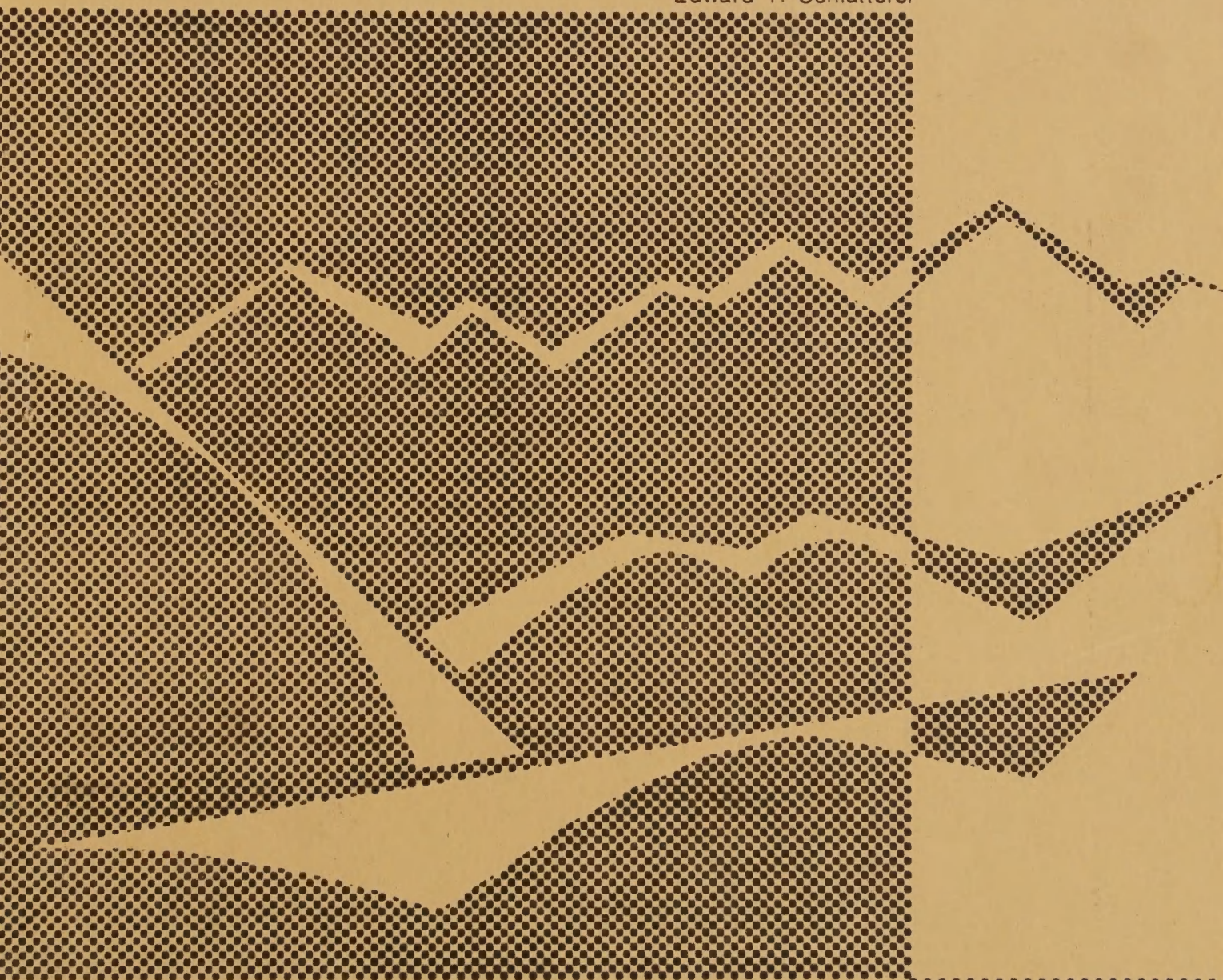
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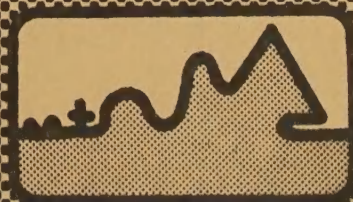
# **ITS AND MINERAL ELEMENTS**

found in the  
**SAWOOTH, WHITE CLOUD  
BOULDER AND PIONEER MOUNTAINS**

Edward F. Schlatterer



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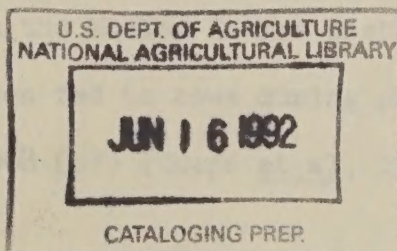
POTENTIALLY HAZARDOUS  
PLANTS AND MINERAL ELEMENTS FOUND IN THE  
SAWTOOTH, WHITE CLOUD, BOULDER, AND PIONEER MOUNTAINS

by

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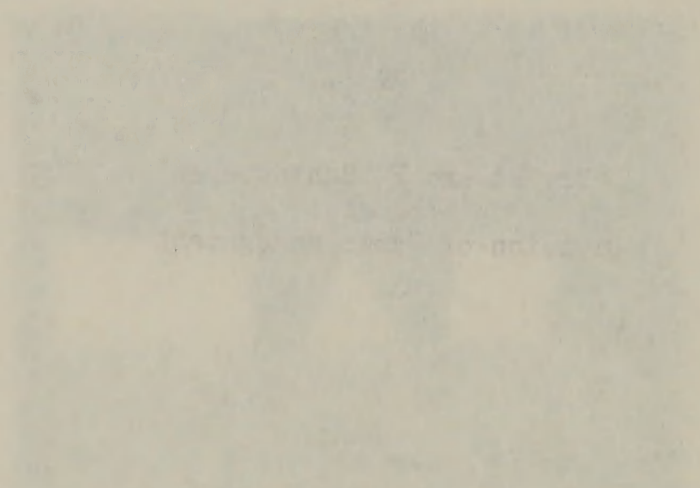
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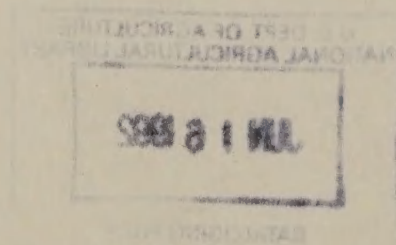
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Plants and mineral elements found in the Sawtooth, White Cloud, Boulder, and Pioneer Mountains that are potentially hazardous to livestock or human health.

#### A. Problem Plants

Over sixty plants found on the area are potentially hazardous to livestock and a number to human health as well (Table 1). Plants belonging to five genera, Astragalus, Delphinium, Lupinus, Oxytropis, and Veratrum have produced known losses of both cattle and sheep, particularly on the Mackay Ranger District of the Challis National Forest. The effects of the toxic properties of these plants have been studied by Dr. Shupe and his associates at Utah State University (see literature cited).

Species of Astragalus and Oxytropis were found to produce abortions and malformations in offspring when ingested by cattle or sheep during pregnancy (James et al, 1967).

Laboratory work with plants collected from the Mackay Ranger District showed that species of Lupinus could produce death in sheep and marked signs of poisoning in cattle (James et al, 1968). Further field experiments in Muldoon Canyon on the Mackay Ranger District showed that Lupinus produced crooked calves when fed to cows during pregnancy (Shupe et al, 1967 (b)) (Shupe et al, 1968 (b)) (Shupe et al, 1967 (a)).

Delphinium is an important problem plant in many parts of the area particularly the Mackay Ranger District. Cattle losses severely affect the management of cattle on this area. Some work has been done testing the plants on the Mackay District and using them for experimental work (Shupe et al, 1967 (b)) (Shupe et al, 1968 (a)).



Veratrum californicum is found in some abundance in Muldoon Canyon on the Mackay Ranger District. When this plant is ingested between the first to the fifteenth day of gestation by sheep, cycloplan-type deformities occur in the lambs. If feeding on Veratrum is continued beyond the fifteenth day of gestation, a much higher than normal number of ewes abort their lambs. Field studies to determine these data were conducted on the Mackay Ranger District by Binns et al (1963).

#### B. Ergot

The common name "ergot" refers to the fruiting body of various species of the fungus, genus Claviceps, formed in the heads of a number of species of wild and cultivated grains and grasses. This fungus has a history going back to ancient times of fatally poisoning humans and animals.

Human poisoning has generally occurred due to the use of infected grain in the manufacture of flour, particularly rye flour. Stock loss is generally due to the ingestion of infected grass, grain, or hay. Incidence of infected grasses is confined mainly to stream bottoms since infection is favored by moist conditions.

"Ergot" was found on Great Basin Wild Rye grass on the Challis National Forest.

I visualize no particular hazard to humans visiting areas in which infected grasses are present. However, should horses or other stock be tied or confined in areas containing infected grass, then poisoning of these animals is possible.



### C. Other Plants

Many plants are capable of producing allergic reactions in humans. Such plants, while annoying, are not normally considered to be dangerous.

### D. Problem Mineral Elements and Compounds

#### Selenium

Stanleya pinnata, a plant which requires Selenium for proper growth, was found in Taylor Canyon on the Mackay Ranger District.

This canyon is on the Wood River Geologic Formation. It is likely that this geologic formation found commonly in the southern half of the area contains Selenium throughout. A number of species capable of accumulating Selenium are found on the area (Table 1). While no livestock losses from Selenium are known on the area, a problem could develop.

#### Nitrates

A number of species found on the area (Table 1) have been found to contain toxic concentrations of nitrates under some conditions (Kingsbury, 1964). No livestock losses due to nitrate poisoning are known for the area.

#### Molybdenum

Molybdenum is a common element on the area although it rarely occurs in quantity at the ground surface.

Kingsbury (1964) cites two ways in which molybdenum may produce a toxic effect in livestock. "Abnormally low molybdenum in soils of normal copper content supports forage which promotes copper accumulation in animals and eventually development of symptoms of copper poisoning -- even death.

Abnormally high molybdenum in soils of normal copper content results in forage which depletes the copper reserves of animals over a period of time



and results in development of symptoms of copper deficiency. Soils of moderate molybdenum content but low copper content do likewise." Diet of the animals, and especially inorganic sulfate content of the forage, influences the toxic effect.

In light of the deposits of molybdenum found on the area, this element is one that might be monitored at strategic locations.

Tailings produced in extracting this mineral, settling ponds, and other effluents from a mining operation could produce higher than normal molybdenum concentrations in the soil and vegetation. Kingsbury (1964) states that leguminous plants accumulate molybdenum to some degree. Species of this group of plants would be more sensitive to increases in the molybdenum levels and would be useful for monitoring. No livestock losses due to molybdenum poisoning are known for the area.

#### Copper

Copper is found at various points in the area, and a few mines exist. Copper is capable of producing toxicity in livestock. Molybdenum and copper are antagonistic in animal nutrition as stated above.

No livestock losses due to copper poisoning are known for the area.

#### Fluorine

At least one hot spring in the Warm Springs drainage of the Ketchum Ranger District is known to contain high amounts of fluoride (12.5 ppm) in the water. Vegetation from the area surrounding this hot spring also contains high amounts of fluoride (16 to 92 ppm).



Shupe (1970) indicates for dairy cattle that acute fluorosis results when the diet contains over 250 ppm fluoride. Chronic fluorosis ranging from borderline to severe occurs when dairy cattle are fed 30 to 109 ppm fluoride in the diet.

Elk from the Wakefield Spring in the Warm Springs Drainage have been examined, and some have exhibited symptoms of chronic fluorosis. The effect of this disease on the elk population utilizing the winter range area adjacent to the spring is unknown.

Hot springs occur throughout the area and may be a source of fluorine contamination of vegetation and water. Careful monitoring should be considered at strategic locations to protect animal and human health.



TABLE 1

Potentially Toxic Plants and Plant Groups Found on the Sawtooth,  
White Cloud, Boulder, Pioneer Mountains

<u>Plant Species</u>		<u>Known to be toxic to -</u>
<u>Forbs</u>	<u>Toxic Principal</u>	
<i>Achillea millefolium</i>	Alkaloid	Cattle
<i>Actaea rubra</i>	Essential oil	Humans & livestock
<i>Allium</i> spp.	Alkaloid	Livestock
<i>Amaranthus retroflexus</i>	Toxic concentration of nitrates measured	Livestock
<i>Amsinckia</i> sp.	Toxic concentration of nitrates measured	Livestock
<i>Anthemis</i> spp.	Unknown	Poultry
<i>Aster</i> spp.	Some spp. secondary selenium accumulation	Livestock
<i>Astragalus</i> spp.	Some spp. are selenium indicators; some are secondary selenium accumulators	Livestock
* <i>A. convallarius</i>	Alkaloidal	Livestock (loco)
* <i>A.</i> spp.	Alkaloidal	" (abortion)(loco)
<i>Caltha</i> spp.	Anemonin - protoanemonin	Man & livestock
<i>Castilleja</i> spp.	Some spp. are secondary selenium accumulators	Livestock
<i>Chenopodium</i> spp.	Oxalates & antihelminthic oil	Man & livestock
<i>C.</i> spp.	Toxic concentration of nitrates measured	Man & livestock
<i>C. album</i>	Toxic concentration of nitrates measured	Man & livestock
<i>Cirsium arvense</i>	Toxic concentration of nitrates measured	Livestock
<i>Clematis</i> spp.	Alkaloidal, glycosidal & saponic factors protoanemonin	Livestock
<i>Conyza</i> sp.	Unknown	Sheep
<i>Corydalis aurea</i>	Alkaloids	Livestock
* <i>Delphinium</i> spp.	Alkaloids	Cattle-minor sheep
* <i>D. depauperatum</i>	Alkaloids	Cattle-minor sheep
* <i>D. barbeyi</i>	Alkaloids	Cattle-minor sheep
<i>Descurainia</i> sp.	Unknown	Cattle
<i>Equisetum</i> spp.	Thiaminase and alkaloids	Livestock
<i>E. arvense</i>	Thiaminase and alkaloids	Livestock
<i>Fritillaria</i> sp.	Alkaloids	Human?
<i>Grindelia squarrosa</i>	Secondary selenium accumulator	Livestock
<i>Haplopappus</i> spp.	Toxic conc. of nitrates measured - alcohol tremetol conc. in some spp.	Livestock
<i>Helianthus annuus</i>	Toxic concentration of nitrates measured	Livestock
<i>Hymenoxys</i> spp.	Unknown	Livestock
<i>Hyoscyamus niger</i>	Alkaloids	Man & livestock
<i>Iris missouriensis</i>	Unknown	Livestock
<i>Lactuca serriola</i>	Unknown - toxic conc. of nitrates measured	Cattle
<i>Linum lewisii</i>	Cyanogenetic glycoside	Livestock
* <i>Lupinus sericeus</i>	Alkaloids	Livestock
<i>Macracranthera</i> sp.	Secondary selenium accumulators	Livestock
* <i>Oxytropis sericea</i>	Alkaloids	Livestock (loco)
* <i>Oxytropis sericea</i>	Alkaloids	Abortion sheep-cattle
<i>Penstemon</i> sp.	Secondary selenium accumulators	Livestock
<i>Polygonum</i> sp.	Toxic concentration of nitrates measured	Livestock
<i>Polygonum</i> sp.	Unknown - photosensitization	Livestock

\*Plants and plant groups which have caused known livestock losses on the study area.



## Plant Species

### Forbs (Cont.)

### Toxic Principal

### Known to be toxic to -

Ranunculus sp.	Protoanemonin	Livestock
Rumex sp.	Oxalates - toxic conc. of nitrates measured	Livestock
Salsola kali	Oxalates - toxic conc. of nitrates measured	Livestock
Senecio spp.	Alkaloids	Man & livestock
S. integerrimus	Alkaloids	Man & livestock
Solidago spp.	Unknown	Sheep
Solidago spp.	Toxic concentration of nitrates measured	Livestock
Stanleya pinnata	Obligate selenium indicator plant	Livestock
Stellaria sp.	Toxic concentration of nitrates measured	Livestock
Thlaspi arvense	Mustard oils - isothiocyanates	Livestock
Trifolium pratense	Alsike - photosensitization	Livestock
T. spp.	Alsike - photosensitization	Livestock
Urtica sp.	Toxic concentration of nitrates measured	Livestock
*Veratrum californicum	Alkaloids	Sheep
Zigadenus elegans	Alkaloids	Man & livestock
Z. paniculatus	Alkaloids	Man & livestock

### Grasses

Agropyron spp.	(Fruiting body of fungus Claviceps )	Man & livestock
Agrostis alba	(Attacks seedheads of some grasses )	Man & livestock
Bromus inermis	((Alkaloids produced) "Ergot" )	Man & livestock
Calamagrostis spp.	( )	Man & livestock
Elymus spp.	( )	Man & livestock
Elymus cinereus	( )	Man & livestock
Poa spp.	( )	Man & livestock
Festuca spp.	Alkaloids produced in nonheaded plants by fungus	Man & livestock
Glyceria striata	Cyanogenetic potential	Cattle

### Trees & Shrubs

Artemisia spp.	Volatle oils (large amounts)	Livestock
Atriplex spp.	Some species secondary selenium accumulators	Livestock
Cercocarpus sp.	Cyanogenetic potential	Livestock
Chrysothamnus nauseosus	Unknown	Livestock
Grayia sp.	Secondary selenium accumulators	Livestock
Haplopappus spp.	Toxic concentration of nitrates measured in some spp.	Livestock
Haplopappus spp.	Alcohol tremetol (in some species)	Livestock
Juniperus sp.	Unknown	Livestock
Kalmia polifolia	Toxic resinoids	Man & livestock
Ledum glandulosum	Toxic resinoids	Man & livestock
Pinus ponderosa	Unknown	Still birth-cattle
Prunus virginiana	Cyanogenetic glycosides	Man & livestock
Sambucus sp.	Unknown	Man & livestock
Tetradymia canescens	Unknown - photosensitization	Sheep

Above taken from Kingsbury (1964).

\*Plants and plant groups which have caused known livestock losses on the study area.



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